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Uni. Roll No. ……………

Program: B.Tech (CSE)

15-01-2022(E)

Semester: 5

Name of Subject: Design and Analysis of Algorithm

Subject Code: PCCI-111

Paper ID: 16431

Time Allowed: 02 Hours **Max. Marks: 60**

NOTE:

1) Each question is of 10 marks.
2) Attempt any six questions out of nine
3) Any missing data may be assumed appropriately

Q1. a) Explain the Big-oh computation for the following.

1. Sequencing 2. if-then-else 3. while loop 4. for loop

5. recursion

b) Use a recursion tree to determine a good asymptotic upper bound on the recurrence $T(n) = 3T(n/4) + c\,n^2$. Use the substitution method to verify your answer.

Q2. a) Compare the sorting methods of merge sort and quick sort. Also compare their performance.

b) Explain how is the Prim's algorithm better in finding the minimum spanning tree in comparison to Kruskal's algorithm.

Q3. a) Evaluate an optimal solution to the fractional knapsack instance n = 7, m= 15, (p1, p2, …, p7) = (10, 5, 15, 7, 6, 18, 3) and (w1, w2, …, w7) = (2, 3, 5, 7, 1, 4, 1) using greedy method.

b) Illustrate are the characteristics of greedy method. Explain any greedy algorithm with example.

Q4. Deduct All pair shortest path for the following figure. Also prove how principle of optimality holds true.
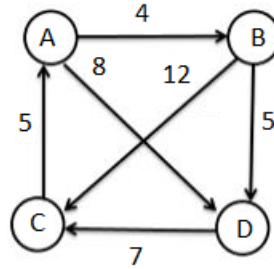
Q5. a) Distinguish between greedy method and Dynamic programming by giving a suitable example.

b) Write the pseudocode to determine Bi-components.

Q6. Traverse the following graph using BFS and DFS and create the sequence of the vertices visited
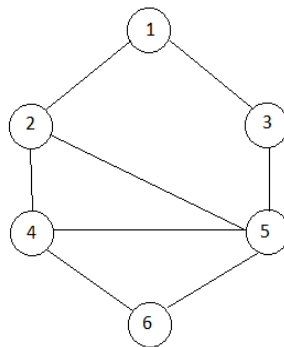
Q7. Explain how backtracking is used for solving n - queens problem. Construct the state space tree for 4-queens problem.

Q8. Compare the efficiency of the following string-matching algorithms by applying them for searching the pattern 'abaa' from the sting 'ababbaabaaab'.

a) Brute force algorithm

b) Rabin-Karp algorithm

Q9. Discuss the performance ratio of approximation algorithm quoting a suitable example.

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